What is claimed is:

1. A system for detecting the presence of a tone within a signal, comprising:

Fourier Transform means for performing a Fourier Transform on an incoming signal,

wherein the Fourier Transform means generates a frequency spectrum for the incoming signal;

normalizing means for receiving the generated frequency spectrum and normalizing the spectrum for magnitude,

wherein the normalizing means generates a normalized frequency spectrum;

integrator means for receiving the normalized frequency spectrum and generating a mean of the normalized frequency spectrum; and

comparator means for determining whether the mean of the normalized frequency spectrum exceeds a predetermined threshold value,

if said mean exceeds the predetermined threshold value, the comparator means generates a signal indicating that a tone is detected,

if said mean does not exceed the predetermined threshold value, the comparator means generates a signal indicating that no tone is detected.

2. The system of claim 1, further comprising:

a codec for receiving an incoming analog signal and converting it to a corresponding digital signal; and

a digital signal processor for receiving the converted signal,

wherein the digital signal processor includes circuitry comprising the Fourier Transform means, the normalizing means, the integrator means, and the comparator means.

3. The system of claim 1, wherein the Fourier Transform means generates discrete frequency bins representing specific frequency ranges for the incoming signal and wherein a single frequency bin is generated relating to the tone being detected.

4. The system of claim 3, further comprising:

a tone portion of the incoming signal for the frequency bin relating to the tone being detected is represented by the expression:

$$\begin{aligned} R_k(\eta) &= A_r e^{j\theta_r} \\ &= A_r[\cos(\theta_r) - j\sin(\theta_r)]' \end{aligned}$$

where η is the bin number, A_r is the amplitude of the tone portion, and θ is the phase angle; and

a noise portion of the incoming signal for the frequency bin relating to the tone being detected is represented by the expression:

$$\begin{aligned} N_k(\eta) &= A_n(k) e^{j\theta_n(k)} \\ &= A_n(k)[\cos(\theta_n) - j\sin(\theta_n)]' \end{aligned}$$

where A_n is the amplitude of the noise portion, θ is the phase angle, and k is a symbol index.

5. The system of claim 1, wherein:

a frequency spectrum for the incoming signal includes a real component and an imaginary component; and

the normalizing means generates a normalized frequency spectrum by multiplying an inverted magnitude of the incoming signal by each of the real and imaginary components of the frequency spectrum.

6. The system of claim 1, wherein the predetermined threshold value is 0.5.

7. The system of claim 1, wherein the Fourier Transform means perform a Discrete Fourier Transform on the incoming signal.

8. The system of claim 1, wherein the Fourier Transform means perform a Fast Fourier Transform on the incoming signal.

9. The system of claim 1, wherein the Fourier Transform means perform a Goertzel Transform on the incoming signal.

10. A method for detecting the presence of a tone within a signal, comprising the steps of:

generating a frequency spectrum for an incoming signal;

normalizing the generated frequency spectrum for magnitude;

generating a normalized frequency spectrum;

generating a mean of the normalized frequency spectrum;

determining whether the generated mean of the normalized frequency spectrum exceeds a predetermined threshold value;

generating a signal indicating that a tone is detected if it is determined that the mean exceeds the predetermined threshold value; and

generating a signal indicating that no tone is detected if it is determined that the mean does not exceed the predetermined threshold value.

11. The method of claim 10, further comprising the steps of:

receiving an incoming analog signal into a codec;

converting the incoming analog signal into a corresponding digital signal; and

receiving the digital signal into a digital signal processor,

wherein the digital signal processor performs detects the presence of a tone in the digital signal.

12. The method of claim 10, further comprising the step of generating discrete frequency bins representing specific frequency ranges for the incoming signal, wherein a single frequency bin is generated relating to the tone being detected.

13. The method of claim 12, further comprising the steps of:

representing a tone portion of the incoming signal for the frequency bin relating to the tone being detected by the expression:

$$\begin{aligned} R_k(\eta) &= A_r e^{j\theta_r} \\ &= A_r[\cos(\theta_r) - j\sin(\theta_r)] \end{aligned},$$

where η is the bin number, A_r is the amplitude of the tone portion, and θ is the phase angle; and

representing a noise portion of the incoming signal for the frequency bin relating to the tone being detected by the expression:

$$\begin{aligned} N_k(\eta) &= A_n(k) e^{j\theta_n(k)} \\ &= A_n(k)[\cos(\theta_n) - j\sin(\theta_n)] \end{aligned},$$

where A_n is the amplitude of the noise portion, θ is the phase angle, and k is a symbol index.

14. The method of claim 10, further comprising the step of generating a normalized frequency spectrum by multiplying an inverted magnitude of the

incoming signal by each of the real and imaginary components of the frequency spectrum.

15. The method of claim 10, wherein the predetermined threshold value is 0.5.

16. The method of claim 10, wherein the step of generating a frequency spectrum for an incoming signal is performed by Fourier Transform means.

17. The method of claim 16, wherein the Fourier Transform means perform a Discrete Fourier Transform on the incoming signal.

18. The method of claim 16, wherein the Fourier Transform means perform a Fast Fourier Transform on the incoming signal.

19. The method of claim 16, wherein the Fourier Transform means perform a Goertzel Transform on the incoming signal.

20. A programmable digital signal processor including a computer readable storage medium incorporating instructions for detecting the presence of a tone within a signal, the instructions comprising:

one or more instructions for generating a frequency spectrum for an incoming signal;

one or more instructions for normalizing the generated frequency spectrum for magnitude;

one or more instructions for generating a normalized frequency spectrum;

one or more instructions for generating a mean of the normalized frequency spectrum;

one or more instructions for determining whether the generated mean of the normalized frequency spectrum exceeds a predetermined threshold value;

one or more instructions for generating a signal indicating that a tone is detected if it is determined that the mean exceeds the predetermined threshold value; and

one or more instructions for generating a signal indicating that no tone is detected if it is determined that the mean does not exceed the predetermined threshold value.

21. The programmable digital signal processor of claim 20, further comprising one or more instructions for generating discrete frequency bins representing specific frequency ranges for the incoming signal, wherein a single frequency bin is generated relating to the tone being detected.

22. The programmable digital signal processor of claim 21, further comprising:

one or more instructions for representing a tone portion of the incoming signal for the frequency bin relating to the tone being detected by the expression:

$$\begin{aligned} R_k(\eta) &= A_r e^{j\theta_r} \\ &= A_r[\cos(\theta_r) - j\sin(\theta_r)] \end{aligned},$$

where η is the bin number, A_r is the amplitude of the tone portion, and θ is the phase angle; and

one or more instructions for representing a noise portion of the incoming signal for the frequency bin relating to the tone being detected by the expression:

$$\begin{aligned} N_k(\eta) &= A_n(k) e^{j\theta_n(k)} \\ &= A_n(k)[\cos(\theta_n) - j\sin(\theta_n)] \end{aligned},$$

where A_n is the amplitude of the noise portion, θ is the phase angle, and k is a symbol index.

23. The programmable digital signal processor of claim 20, further comprising one or more instructions for generating a normalized frequency spectrum by multiplying an inverted magnitude of the incoming signal by each of the real and imaginary components of the frequency spectrum.

24. The programmable digital signal processor of claim 20, wherein the predetermined threshold value is 0.5.

25. The programmable digital signal processor of claim 20, wherein the one or more instructions for generating a frequency spectrum for an incoming signal is performed by Fourier Transform means.

26. The programmable digital signal processor of claim 25, wherein the Fourier Transform means perform a Discrete Fourier Transform on the incoming signal.

27. The programmable digital signal processor of claim 25, wherein the Fourier Transform means perform a Fast Fourier Transform on the incoming signal.

28. The programmable digital signal processor of claim 25, wherein the Fourier Transform means perform a Goertzel Transform on the incoming signal.